Supplementary Advice on Conservation Objectives for The Canyons Marine Conservation Zone UKMCZ0027

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The information provided in this document sets out JNCC's supplementary advice on the conservation objectives set for The Canyons Marine Conservation Zone (MCZ), hereafter referred to as 'the site'. This document forms part of JNCC's formal conservation advice package for the site and must be read in conjunction with all parts of the package as listed below:

- **Background Document** explaining where to find the advice package, JNCC's role in the provision of conservation advice, how the advice has been prepared, when to refer to it and how it can be applied;
- **Conservation Objectives and Management Advice** document setting out the broad ecological aims for the site and JNCC's advice on;
    - protected feature condition;
    - conservation benefits that the site can provide if managed effectively; and
    - conservation measures that JNCC consider are required to support achievement of the conservation objectives stated for the site.
- **Advice on Operations** providing information on those human activities that, if taking place within or near the site, can impact it and hinder the achievement of the conservation objectives stated for the site.

The most up-to-date conservation advice package for the site can be downloaded from the conservation advice section of the Site Information Centre (SIC) on JNCC's website.

The advice presented here describes the ecological characteristics or 'attributes' of the site's protected features: **deep-sea bed, cold-water coral reefs, coral gardens and sea-pen and burrowing megafauna communities**, specified in the site's conservation objectives listed in the site's Designation Order (2013) and Designation Order Amendment (2019). These attributes include extent and distribution, structure and function and supporting processes.

Figure 1 below illustrates the concept of how a protected feature's attributes are interlinked: with impacts on one potentially having knock-on effects on another e.g. the impairment of any of the supporting processes on which a feature relies can result in changes to its extent and distribution, and structure and function.

Collectively, the attributes set out in Table 1, Table 2 and Table 3 below, along with the objectives set for each of them, describe the desired ecological condition (favourable) for the

site's protected features. All attributes listed in Table 1, Table 2 and Table 3 must be taken into consideration when assessing impacts from an activity.

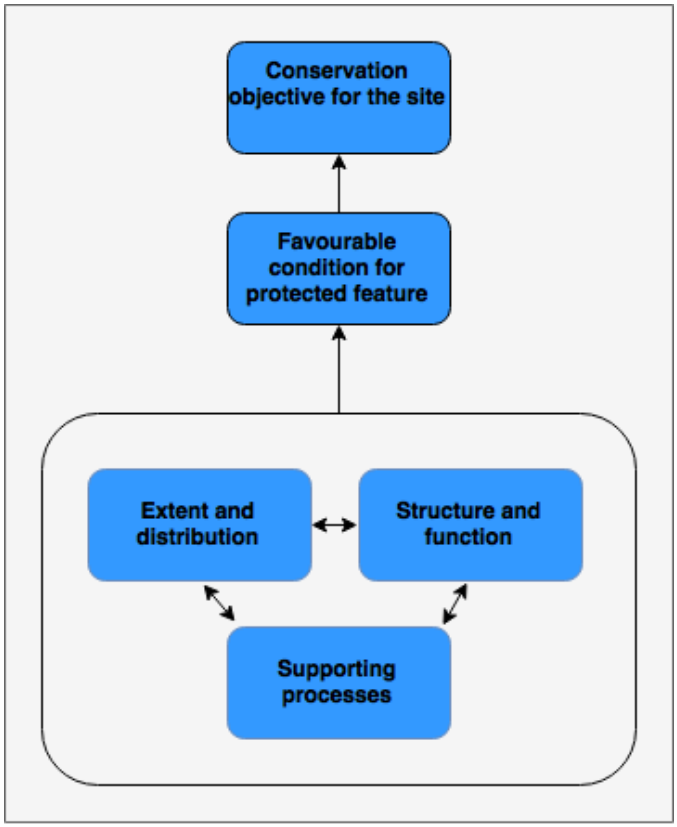

Figure 1. Conceptual diagram showing how feature attributes are interlinked and collectively describe favourable condition and contribute to the conservation objectives stated for the site.

In Table 1, Table 2 and Table 3 below, the attributes for the cold-water coral reefs and coral gardens features, sea-pen and burrowing megafauna communities feature and deep-sea bed protected feature are listed respectively. An objective of recover or maintain is set for each protected feature attribute, reflecting our current understanding of available evidence e.g. whether it indicates some of a protected feature's extent is lost and needs to be recovered or that extent is not lost and needs to be maintained to ensure the protected feature is in overall favourable condition. Where a recover objective is advised and there is considerable uncertainty as to whether recovery is possible, this will be noted alongside the objective.

The rationale for setting an objective is provided in the summary of evidence column and supporting references listed in the reference section at the end of this document.

Note: when a maintain objective is set, this does not preclude the need for management, now or in the future to ensure a protected feature remains in favourable condition.

Table 1: Supplementary Advice on Conservation Objectives for cold-water coral reefs and coral gardens protected features of the site

In summary, the cold-water coral reefs and coral gardens protected features of the site are considered by JNCC to be in unfavourable condition and need to be recovered. This conclusion is driven by evidence that suggests bottom-towed fishing gear and anchored nets or line use taking place prior to the introduction of a fisheries byelaw may have impacted upon their extent and distribution, and structure and function. Whilst a fisheries byelaw came into force in June 2022 (MMO, 2022) that prohibits bottom towed fishing gear and anchored nets or line use from the majority of the site, the extent and distribution, and structure and function of cold-water coral reefs and coral gardens protected features of the site will not yet have had sufficient time to recover. Further information on activities capable of affecting the protected features of the site can be found in the Advice on Operations workbook available also in the conservation advice section of the SIC.

Attribute	Summary of evidence	View of attribute condition & objective	Confidence in attribute condition
Extent and distribution	For both cold-water coral reefs and coral gardens, extent refers to the total area of biogenic habitat within the site and how it is distributed across that area. Reductions in extent or distribution can alter biological and physical functioning and affect the health and resilience of associated communities (JNCC, 2004). It is therefore important to conserve the full known extent and distribution of these habitats. Coral extent can vary naturally, but rising temperatures and increasing sea-water acidity may lead to long-term decline (Jackson *et al*., 2014). Our current understanding of the extent and distribution of cold-water coral reefs and coral gardens within the site is shown in JNCC's Interactive MPA Mapper. Live cold-water corals (such as *Lophelia pertusa*) and coral gardens have a patchy distribution covering a relatively small extent of the northern region of site. Live patches of confirmed cold-water coral reef and coral gardens have been found on the northernmost wall of the Explorer Canyon. A small patch of coral gardens has also been recorded in the northwestern region of the site. These are the only known examples of cold-water coral features designated in England's seas.	Unfavourable - needs to be recovered.	Cold-water coral reef – Medium confidence. Our understanding of feature sensitivity to pressures associated with historical bottom-contacting fishing gear use (from VMS data from 2009 to 2020) where the feature occurs, suggests some cold-water coral reef extent has been lost. This is supported by direct evidence from within the site; fishing-related litter, potential trawl scars and coral rubble observed on the 2007 MESH survey (Davies *et al.,* 2008) and widespread biogenic coral rubble and fishing-related litter recorded in the CEND0917 survey (Savage *et al.,* 2025). While not conclusive, both direct and indirect evidence suggests that cold-water coral reef extent has been lost, which increases confidence in this assessment. Confidence cannot be high however, as it is not certain that feature degradation is directly linked to human activities and the

	However, only a small proportion of the site has been surveyed and habitat which is suitable for coral colonisation exists elsewhere in the site. It is therefore possible that cold-water coral reefs and coral gardens extent and distribution extend beyond the areas currently mapped. Survey evidence from within the site indicates that the extent and distribution of both cold-water coral reefs and coral gardens could have historically been adversely impacted by bottom-contact fishing practices. Observations of potential trawl scars, fishing-related litter, and widespread biogenic coral rubble (Davies *et al.*, 2008; Savage *et al.*, 2025) suggest that these habitats could previously have been more extensive. Vessel Monitoring System (VMS) data (2009-2020) supports a history of bottom-contacting fishing activity across areas in the site containing coral features. These features are sensitive to pressures associated with bottom-contacting fishing, such as abrasion, penetration and disturbance of the seabed, water clarity changes and smothering, and removal of non-target species. Zoned fishing gear byelaws (MMO, 2022) banning bottom-towed fishing gear and anchored nets or line have been in place since June 2022 in areas where coral features are mapped. However, there is currently no published evidence of measurable recovery of the coral features within the site, with studies indicating degraded condition (Davies *et al.*, 2008; Savage *et al.*, 2025). Given the slow growth and uncertain recruitment dynamics of cold-water corals (Huvenne *et al.*, 2016; Montseny *et al.*, 2021), insufficient time will have passed for recovery of extent and distribution of coral features to have occurred. JNCC therefore advises a recover objective for extent and distribution for both coral features in the site, noting their recovery is uncertain particularly in light of pressures associated with climate change.		feature's full extent & distribution within the site is uncertain. Our information about activities within the site is also incomplete e.g. our best available evidence for fishing activities (VMS data) only goes up to 2020 and it also cannot support an assessment of impacts from static gear fishing. A confidence of moderate is therefore given for this assessment. Coral gardens – Low confidence For the same reasons as cold-water coral reefs, confidence in the assessment of extent and distribution for coral gardens cannot be high. However, unlike the assessment of cold-water coral extent and distribution, indirect evidence for this assessment is based solely on our understanding of feature sensitivity to pressures associated with human activities and is not supported by site-based evidence. For this reason, confidence in this assessment is low.
Structure and function	The structure and function of cold-water coral reefs and coral gardens are shaped by colony size, complexity, and density, which influence habitat structure and biodiversity (Buhl-Mortensen and Mortensen 2005; Bo *et al*. 2009; Baillon *et*	Unfavourable - needs to be recovered.	Cold-water coral reefs and coral gardens – Low confidence.

	al. 2012; Pascual 2015; Beazley *et al*. 2015). Reef topography and the mix of live coral, dead framework and rubble further shape hydrodynamics and communities (Henry *et al*. 2009; Purser *et al*. 2013; Buhl-Mortensen 2017). JNCC does not consider that there is enough evidence to assess conservation status of the key and influential species associated with the protected coral features. However, limited survey evidence, as presented under extent and distribution, indicates that the structure, and thus function, of coral features within The Canyons MCZ has been adversely impacted by fishing activity Based on this evidence, JNCC advises a recover objective.		This assessment is supported by limited indirect and direct evidence. Little is known about the structure and function of cold-water coral reefs in The Canyons MCZ and there is a lack of understanding of key and influential species for these coral features which limits our assessment. Evidence on human activity is limited to VMS data which extends only to 2020. These gaps mean pressures and observed impacts on the status of the features' structure and function cannot be fully understood, limiting confidence in condition to 'low' for this assessment.
Supporting processes	Supporting processes for cold-water coral reefs and coral gardens include the hydrodynamic regime, physical topography, suitable supporting habitat and water and sediment quality. These processes support food delivery and larval supply (Hiscock *et al*. 2004; Mienis *et al*. 2007; Davies *et al*. 2009) and maintain conditions for coral growth on slopes, ridges, and mounds (Hall-Spencer *et al*. 2007; Tracey *et al*. 2011). Conserving these natural processes is necessary to maintain the ecological functioning and recovery potential of coral habitats. There is no evidence to suggest that human activities are having an adverse impact on the typical hydrodynamic regime of the site. Whilst it is noted that the Celtic Seas OSPAR region within which the site is located has been assessed to have a poor contaminant status (Larsen *et al.,* 2022), this is insufficient evidence to assess water or sediment quality in the site. Survey observations of potential trawl scars and extensive coral rubble indicate localised damage to supporting habitat, which may have reduced the availability of stable hard substrata needed for coral settlement and recovery. However, as noted under extent and distribution, knowledge of the wider feature extent is limited, and coral rubble could be created by natural processes. Beyond these localised impacts, there is no evidence that the supporting	Favourable – needs to be maintained.	Cold-water coral reefs and coral gardens – Low confidence. The evidence-base supporting JNCC's assessment of supporting processes within the site largely draws upon data from the wider Celtic Sea Region (Larsen *et al*., 2022), rather than any specific evidence available from within, or in close proximity to, the site itself. This lack of data pertaining to water and sediment quality within the site limits this assessment. Moreover, there is a lack of time series data about water quality and on how human activities may have impacted this. Whilst survey data within the site shows localised damage of coral habitat, our knowledge of the impact of this on supporting processes is limited. These knowledge gaps mean pressures on the features cannot be fully understood, limiting confidence in condition to 'low' for this assessment.

	processes required for coral features are being impeded. JNCC advises a maintain objective on this basis.		

Table 2: Supplementary Advice on Conservation Objectives for sea-pen and burrowing megafauna communities protected feature of the site

In summary, the protected feature sea-pen and burrowing megafauna communities is considered by JNCC to be in unfavourable condition and needs to be recovered. This conclusion is driven by evidence that suggests anchored nets or line practices taking place prior to the introduction of a fisheries byelaw may have impacted upon the extent and distribution, and structure and function, of the sea-pen and burrowing megafauna communities protected feature of the site. Whilst a fisheries byelaw came into force in June 2022 (MMO, 2022) that prohibits bottom-towed fishing gear and anchored nets or line from the majority of the site, the extent and distribution, and structure and function, of sea-pen and burrowing megafauna communities will not yet have had sufficient time to recover. Further information on activities capable of affecting the protected features of the site can be found in the Advice on Operations workbook available also in the conservation advice section of the SIC.

Attribute	Summary of evidence	View of attribute condition & objective	Confidence in attribute condition
Extent and distribution	The extent and distribution of sea-pen and burrowing megafauna communities is defined by sediment composition and biological assemblages. Any changes to sediment composition and biological assemblages brought about by human activities may impact the conservation status of the protected features. The site map for The Canyons MCZ is available on JNCC's Interactive MPA Mapper and shows the known extent and distribution of the feature within the site. The known extent and distribution of sea pen and burrowing megafauna communities within the site are currently limited to a small cluster in the northwestern area. As the remotely operated vehicle (ROV) data from the 2015 CODEMAP survey (Huvenne *et al.*, 2016) only covered a limited section of the site, current understanding is constrained by survey effort, and the feature may extend beyond the area observed. Gridded VMS data (2009-2020) indicate historical gill net fishing occurred over the mapped extent of the feature between 2010	Unfavourable - needs to be recovered.	Low confidence – JNCC has a limited baseline understanding of the extent and distribution of the feature within the site. Evidence for impact is indirect, based on the sensitivity of sea-pen and burrowing megafauna communities to pressures associated with human activities, including gill-netting. Activity data are incomplete, as the best available fishing evidence only extends to 2020. These gaps limit understanding of current pressures on the feature, resulting in low confidence in this assessment. The spatial resolution of VMS data (2009–2020) for gillnetting is coarse. It is not possible to confirm overlap of the historical gear use with the protected feature.

	and 2019, which suggests the feature has been exposed to physical pressures which can impact its extent and distribution such as abrasion and penetration. JNCC advises a recover objective on this basis.		For these reasons confidence in this assessment is low.
Structure and function	The structure and function of sea-pen and burrowing megafauna communities depend on the fine mud sediments they inhabit and the key species that modify them. Bioturbators create burrows and mounds that support oxygen exchange and nutrient cycling (Elliott *et al*. 1998; Barros *et al*. 2004). Sea pens such as *Virgularia mirabilis* and *Pennatula phosphorea* contribute to habitat complexity and support diverse infaunal and epifaunal communities (OSPAR 2011; Hughes *et al*. 2005). Changes in sediment type or the distribution of characteristic species can indicate shifts in habitat condition. Maintaining natural sediments, key bioturbators and characteristic communities is essential to sustaining nutrient processing, secondary production, and habitat provision. JNCC does not consider that there is enough evidence to assess the conservation status of the key and influential species associated with this protected feature of the site. However, JNCC conclude that the features' structure and function may have been impacted by fishing activity as discussed in extent and distribution, which can impact the characteristic communities of the protected feature. A fisheries byelaw came into force in June 2022 (MMO, 2022) that prohibits bottom-towed fishing gear and anchored nets or line from part of the site, which includes this feature. While this removes key pressures of concern (abrasion, penetration, and removal of non-target species) from the site, the features' characteristic communities and therefor structure and function will not yet have had sufficient time to recover. JNCC therefore advises a recover objective on this basis.	Unfavourable - needs to be recovered.	Low confidence – In addition to the reasons provided under the extent and distribution attribute, confidence in this assessment is low also because there is a limited understanding of the structure and function of sea-pen and burrowing megafauna communities. This is based on data from the 2015 CODEMAP survey which had limited site coverage (Huvenne *et al.*, 2016).
Supporting processes	Supporting processes with respect to sea-pen and burrowing megafauna communities include hydrodynamic regime and water and sediment quality. There is no evidence to suggest that	Favourable – needs to be maintained.	Low confidence – The evidence-base supporting JNCC's assessment against this attribute draws upon data from the wider

	human activities are having an adverse impact on the typical hydrodynamic regime to which the site is exposed. Whilst it is noted that the Celtic Seas OSPAR region within which the site is located has been assessed to have poor contaminant status (Larsen *et al.*, 2022), this is insufficient evidence to assess water or sediment quality in the site. Overall, there is no evidence to suggest that supporting processes that operate at this site are being impeded with respect to supporting the presence of the feature. JNCC advises a maintain objective on this basis.		Celtic Sea Region (Larsen *et al.,* 2022), rather than any evidence available from within, or in close proximity to, the site itself. This lack of data pertaining to water and sediment quality within this site limits this assessment. Moreover, there is a lack of time series data information about water quality and on how human activities may have impacted this.

Table 3: Supplementary Advice on Conservation Objectives for deep-sea bed protected feature of the site

In summary, the deep-sea bed protected feature is considered by JNCC to be in unfavourable condition and needs to be recovered. This conclusion is driven by evidence that suggests bottom-towed fishing gear and anchored nets or line practices taking place prior to the introduction of a fisheries byelaw may have impacted upon the structure and function of the deep-sea bed protected feature of the site. Whilst a fisheries byelaw came into force in June 2022 (MMO, 2022) that prohibits bottom-towed fishing gear and anchored nets or line from the majority of the site, the structure and function of the deep-sea bed, as well as it's component protected features of cold-water coral reef, coral garden and sea-pen and burrowing megafauna communities (See Table 1 and Table 2), will not yet have had sufficient time to recover. Further information on activities capable of affecting the protected features of the site can be found in the Advice on Operations workbook available also in the conservation advice section of the SIC.

Attribute	Summary of evidence	View of attribute condition & objective	Confidence in attribute condition
Extent and distribution	The extent and distribution of the deep-sea bed feature includes all seabed beyond the continental shelf break deeper than 200 m. Deep-sea bed may be comprised of a wide range of substrates (EEA, n.d). This feature can encompass extensive areas of slope, plain and other deep-sea geomorphological features. The site map for The Canyons MCZ is available on JNCC's Interactive MPA Mapper and shows the known extent and distribution of the feature within the site. Much of the site, except for two areas lying above 200m in the north-west and south-east, is designated as deep-sea bed.	Favourable – needs to be maintained.	High confidence - This feature is defined solely by depth and as such there is high confidence that no human activities are considered capable of affecting its extent and distribution (e.g., changing the depth of the site).

	Given the deep-sea bed feature is defined by a high-level classification that considers depth alone, it is not considered possible that human activities are capable of changing its extent or distribution within the site (e.g., changing the depth of the site) and therefore JNCC advise a maintain objective.		
Structure and function	Structure and function of deep-sea bed relate to the physical structure itself (finer scale topography) and its biological structure (the presence of key and influential species and characteristic communities). Any changes to seabed composition and biological assemblages within the extent of this feature brought about by human activities may impact the conservation status of the feature. Information about the structure and function of the deep sea-bed feature in the site is limited. JNCC does not consider that there is enough evidence to assess the conservation status of the key and influential species associated with the deep seabed feature in the site. A habitat map for the site (Savage *et al.* 2025) describes the presence and distribution of deep-sea bed biotopes, within which cold-water coral reef, coral garden, and sea-pen and burrowing megafauna communities are key components i.e. sub-features of deep-sea bed. Evidence indicates that these sub-features have been damaged by historical bottom-contacting gear use (See Table 1 and Table 2), affecting their extent and distribution and/or structure and function. While noting the deep-sea bed feature extends beyond these sub-features, their assessments indicate parts of the deep-sea bed structure and function have been damaged. Outwith these areas, VMS data (2009-2020) show the deep-sea bed feature has also been subject to damaging pressures (abrasion, penetration, and removal of non-target species) from bottom-contacting gear use. JNCC conclude that the structure and function of the deep seabed feature may have been impacted by these gears prior to prohibition across the majority of the feature. Fisheries management measures were brought	Unfavourable - needs to be recovered.	Low confidence – JNCC has a baseline understanding of the structure and function of deep-sea bed within the site based on both direct (albeit localised) and indirect evidence to support the assessment. Indirect evidence is based on our understanding of the sensitivity of the deep sea-bed feature to pressures associated with historical activities, in this case demersal fishing. This is supported by direct evidence which suggests the deep-sea bed, and component features of cold-water coral reef and coral garden have been adversely impacted (See Table 1). However, our information about activities within the site is incomplete e.g. our best available evidence for fishing activities only goes up to 2020. The assessment is also limited by the lack of information about the biological communities comprising the feature and our lack of understanding of the key and influential species for this feature. These gaps limit understanding of current pressures on the feature, resulting in medium confidence in this assessment.

	into place in June 2022 (MMO, 2022). The management is partial, with bottom-towed fishing gear and anchored nets or line practices banned from the majority of the site, except for a portion of the northwest and southeast corners. To support recovery, the majority, but not all, of the deep-sea bed feature is now protected from damaging fishing activities. However, insufficient time has passed yet for the deep-sea bed feature to have recovered. JNCC advises a recover objective on this basis, noting the uncertainty in recovery of the coral sub-features.		
Supporting processes	Supporting processes with respect to deep sea-bed habitat include hydrodynamic regime and water and sediment quality. There is no evidence to suggest that human activities are having an adverse impact on the typical hydrodynamic regime to which the site is exposed. Whilst it is noted that the Wider Atlantic OSPAR region within which the site is located has been assessed to have a generally poor contaminant status (Larsen *et al.*, 2022), this is insufficient evidence to assess water or sediment quality in the site. Overall, there is no evidence to suggest that supporting processes that operate at this site are being impeded with respect to supporting the conservation status of deep sea-bed. JNCC advises a maintain objective on this basis.	Favourable – needs to be maintained.	Low confidence - The evidence-base supporting JNCC's assessment against this attribute draws upon data from the Wider Atlantic Region (Larsen *et al.,* 2022), rather than any evidence available from within, or in close proximity to, the site itself. A lack of data pertaining to water and sediment quality within the site itself limits this assessment. Moreover, there is a lack of time series data information about water quality and how human activities may have impacted this.

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